

RF Exposure Report

Project Number: 5028090**Offer Number: SUW-202302004095****Report Number: 5028090EMC15****Revision Level: 0****Client: UTEC, Inc.****Equipment Under Test: Refrigerated Shipping Container Controller****Product Name: Micro-Link 5 Controller****Model: MICROLINK5B****FCC ID: 2AK6N-MICROLINK5B****Applicable Standards: 47 CFR §§ 2.1091****FCC KDB 447498 D01 General RF Exposure Guidance v06****FCC OET Bulletin 65****Report issued on: 30 May 2023****Result: Compliant**

FOR THE SCOPE OF ACCREDITATION UNDER CERTIFICATE NUMBER: 3212.01

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1 General Information

1.1 Client Information

Company Name: UTEC, Inc.
Address: 111 E. Wayne St., Suite 800
City, State, Zip, Country: Fort Wayne, Indiana 46802, USA

1.2 Test Laboratory

Name: SGS North America, Inc.
Address: 620 Old Peachtree Road NW, Suite 100
City, State, Zip, Country: Suwanee, GA 30024, USA

Accrediting Body: A2LA
Type of lab: Testing Laboratory
Certificate Number: 3212.01

1.3 General Information of EUT

Equipment Under Test: Refrigerated Shipping Container Controller
Product Name: Micro-Link 5 Controller
Model: MICROLINK5B
Serial Numbers: 4120W008381

Frequency Ranges: 2402 – 2480 MHz (Bluetooth / BLE)
2412 – 2462 MHz (WLAN)

Data Modes: Bluetooth Low Energy (BLE) – GFSK
Bluetooth Classic – GFSK, $\pi/4$ -DQPSK, 8DPSK
WLAN IEEE 802.11b/g/n – DSSS, OFDM

Antennas: Two internal PCB trace antennas: (each with gain of 4.54dBi)*

Max Conducted Output Power: BLE: 3.5 dBm
Bluetooth Classic: 9.5 dBm
WLAN 2.4GHz: 21.1 dBm

**Data was not measured by SGS laboratory and therefore SGS is not responsible for accuracy. Data obtained via customer, specification sheet, previous regulatory filing or other.*

1.4 Operating Modes and Conditions

Maximum power levels were utilized for all calculations. Simultaneous transmissions are possible between Bluetooth or BLE and WLAN 2.4GHz.

2 RF Exposure

2.1 Test Results

Test Description	Product Specific Standard	Test Result
RF Exposure	FCC Part 1.1310	Compliant

2.2 Test Method

The formula below calculates power density.

$$S = \frac{PG}{4\pi R^2} \quad \text{Or} \quad S = \frac{EIRP}{4\pi R^2}$$

where;

S = Power density (mW/cm²)

P = Maximum sourced based average power delivered to antenna port (mW)

G = Maximum numeric power gain of antenna relative to an isotropic radiator (dBi -> linear)

R = Distance between by-stander and antenna (cm)

EIRP = Equivalent (or effective) isotropically radiated power

The limits for general population / uncontrolled exposure were used at a distance of 20cm.

2.3 Single transmission RF Exposure Levels (mW/cm²)

Band of Operation		Conducted Power w/tolerance	Antenna Gain	Cable Loss	Average EIRP		Distance (R)	Power Density EIRP _{avg} /(4πR ²)	FCC	% of Limit	Verdict
Type	MHz	dBm			dBm	mW	cm	mW/cm ²	mW/cm ²		
WLAN 2.4	2400-2483.5	21.1	4.5	0.0	25.6	366	20	0.073	1.00	7%	Pass
Bluetooth	2400-2483.5	9.5	4.5	0.0	14.0	25	20	0.005	1.00	1%	Pass
Bluetooth LE	2400-2483.5	3.5	4.5	0.0	8.0	6	20	0.001	1.00	0%	Pass

2.4 Simultaneous Conditions

Simultaneous transmissions are evaluated using the equation and highest results from each technology.

$$\frac{S_1}{S_1 \text{ Limit}} + \frac{S_2}{S_2 \text{ Limit}} + \dots + \frac{S_n}{S_n \text{ Limit}} \leq 1.0$$

	WLAN 2.4	Bluetooth	Bluetooth LE
WLAN 2.4		8%	7%
Bluetooth	8%		
Bluetooth LE	7%		

Highlighted cells in the table above indicate worst case.

3 Revision History

Revision Level	Description of changes	Revision Date
0	Initial Release	30 May 2023